UW-M527-POS-V1.0 Android Mainboard

Technical Specification

Document modification history

	Note	Date
1	Created	2024-04

1 Overview

UW-M527-POS-V1.0 is an Android POS motherboard developed based on the Allwinner A527 main chip. This motherboard is equipped with 2GB LPDDR4/4X (optional 4GB) + 8GB eMMC (optional 16GB/32GB, etc.), supports MIPIX2/LVDS/EDPX2/HDMI touch screens, and is a cost-effective Android system POS motherboard. It is the best choice for industries such as AI electronic scales, smart cash registers, self-service vending, and self-service terminals.

Main features:

- Processor Octa-core ARM Cortex-A55 architecture 2.0GHz

- Dual EDP 1× 2560×800@60fps 1× 1080p@60fps

- Dual MIPI DSI Both support 1050p@60fps

- LVDS/HDMI2.0 1080p@60fps HDMI 4K@60fps

- Expansion Interfaces 11× USB(7 headers + 4 standard ports),6× Serial Ports

  4× configurable as TTL/RS232, 1× configurable as RS485, Multiple GPIO and 12C interfaces

- Connectivity WiFi/BT, Ethernet, PCIe 4G module support

- 6-layer immersion gold PCB, Industrial-grade components   Designed for harsh industrial environments

2 Specifications

Hardware specifications：

CPU	Allwinner A527, Octa-core ARM Cortex-A55 @ 2.0GHz
GPU	ARM G57 MC01 GPU
Memory	LPDDR4/4X 2GB/4GB optional (default labeled 2GB)
Built-in Storage	eMMC 8GB/16GB/32GB optional (default labeled 8GB)
Display	1× LVDS interface (single-channel, 6- or 8-bit dual-channel), max resolution 1920×1080 2× EDP, 1× 2560×800@60fps, 1× 1080p@60fps 2× MIPI, max resolution 1920×1080 1× HDMI, supports 4K@60fps
Onboard Backlight	Supports 3.3V/5V/12V selectable
Network	RJ45 standard port (10/100M Ethernet Onboard PCIe interface for 4G/5G modules Bluetooth + Wi-Fi module (802.11b/g/n + BT 4.2)
Image	Supports rotation: 0°, 90°, 180°, 270°

|	
Rotation	
RTC (Real-Time Clock)	Built-in RTC battery, supports scheduled power on/off
Interface device	11× USB ports** (7 headers + 4 standard ports)
	6× Serial ports (7 headers + 4 standard ports), 4× configurable as TTL/RS232 1× configurable as RS485　For sensors, barcode scanners, printers, card readers, etc.
	External power/reset buttons or expansion keypad/LED panel support
	Built-in amplifier (supports 10W×2.8Ω speaker)
Audio	Mic input 1× microphone jack
Touch screen	Supports capacitive/resistive/IR touchscreens via IIC or USB

Software specifications :

Operating System	Android 13
Language	Multi-language
Video	H.265**: MP/VP9 decoder up to 4K@60fps H.264 BL/MP/HP decoder, up to 4K@30fps H.264 BP/MP/HP encoder, up to 4K@25fps MJPEG encoder up to 4K@15fps, JPEG encoder up to 8K x 8K resolution

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Audio Formats	Supports audio playback in formats such as MP3, WMA, MP2, OGG, AAC, M4A, MA4, FLAC, APE, 3GP, WAV, etc.
Image Viewer	Supports JPG, BMP, PNG, GIF Features: Rotation, slideshow playback Max resolution 4096×4096
Document	EPUB, WORD, EXCEL, POWERPOINT, PDF, TXT
Input Method	Standard Android keyboard Optional third-party input methods (supports Chinese, Korean, Japanese, and other languages)
Software Features	Camera, web browsing, instant messaging, email, e-book reader, file explorer (optional)
Management	File manager
	Android OS with root access for custom development
	Scheduled power on/off
	OTA (Over-the-Air) remote updates supported

3 main interfaces

3.1 Interface diagram
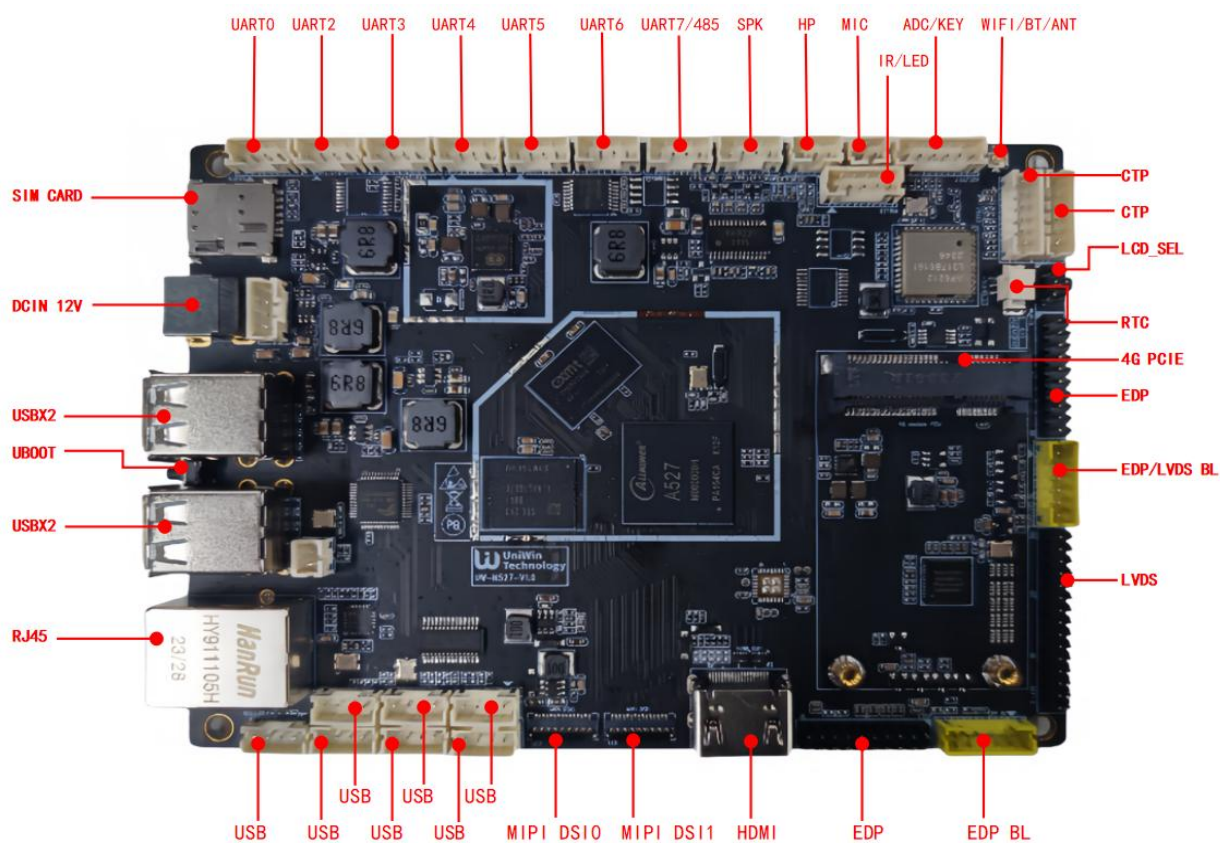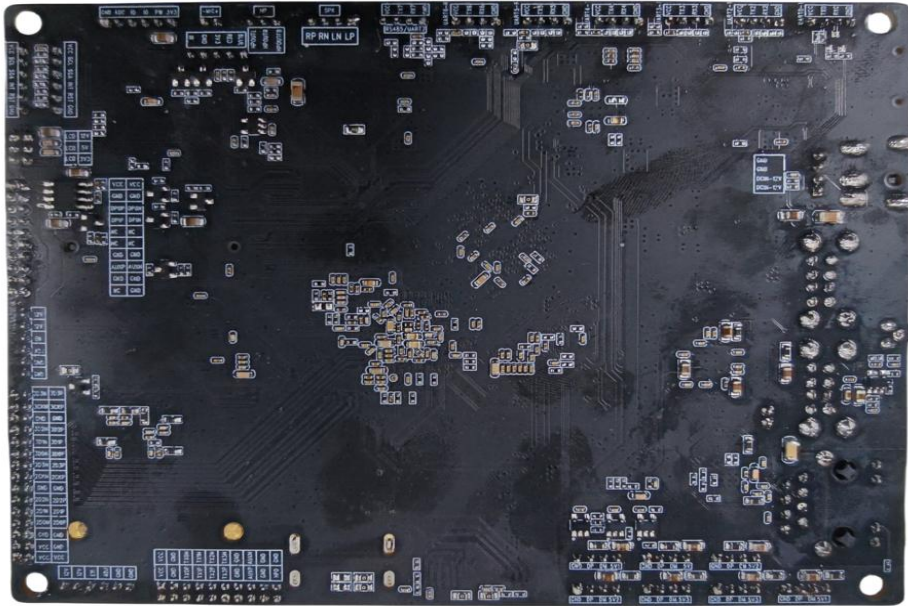
3.2 Interface Introduction

◆ DC12V Power Socket（(Triangular mark indicates Pin 1,

4-pin/2.0mm pitch）

Pinout (as shown by arrow direction in diagram)
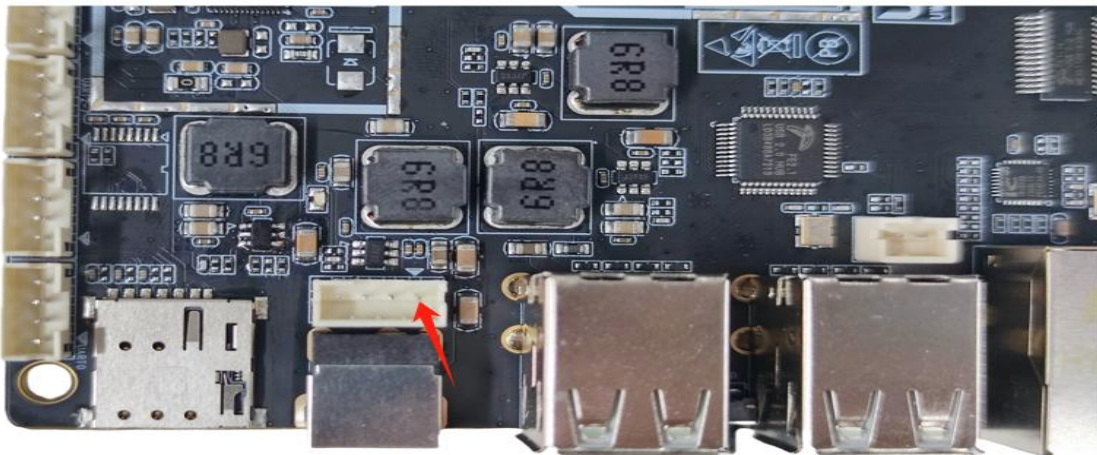
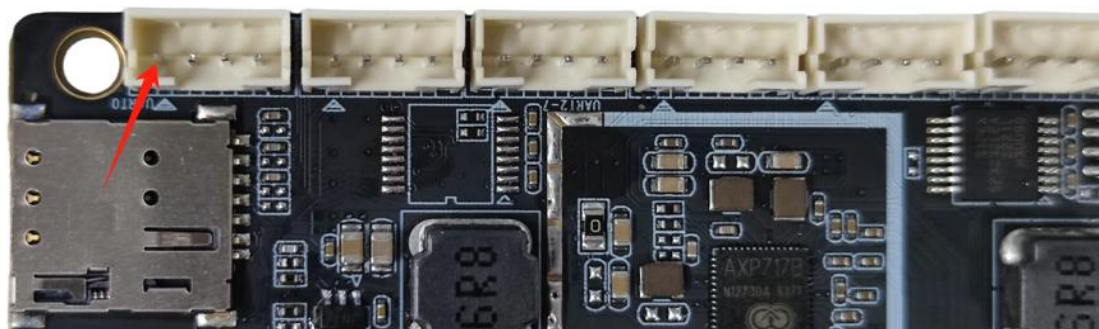| S/N	Definition	Attribute	Description
1	12V	Power input	12V Power input
2	12V	Power input	12VP Power input
3	GND	Ground	Ground
4	GND	Ground	Ground

Important Note：

1.Power Connector Specifications Must match DC jack model, Default socket aperture: 6.0mm Pin outer diameter: 2.0mm, Compatible plug dimensions: 5.5mm (outer) / 2.0mm (inner)

2.Voltage Requirements, Input voltage range for DC jack and 4-pin power port must not exceed ±10% of 12V nominal. Exceeding this range may compromise board stability.

3.Power Adapter Selection,

- Use 3C-certified adapters with:
  - Rated output power ≥ 130-150% of system peak load
  - Example: Select 2.5A-3A adapter for 1.5A actual load

4. Polarity Warning, Reverse connection of 4-pin power may damage motherboard or adapter.

◆ UART0 TTL System Debug Port（Triangular mark indicates Pin 1, 4-pin/2.0mm）

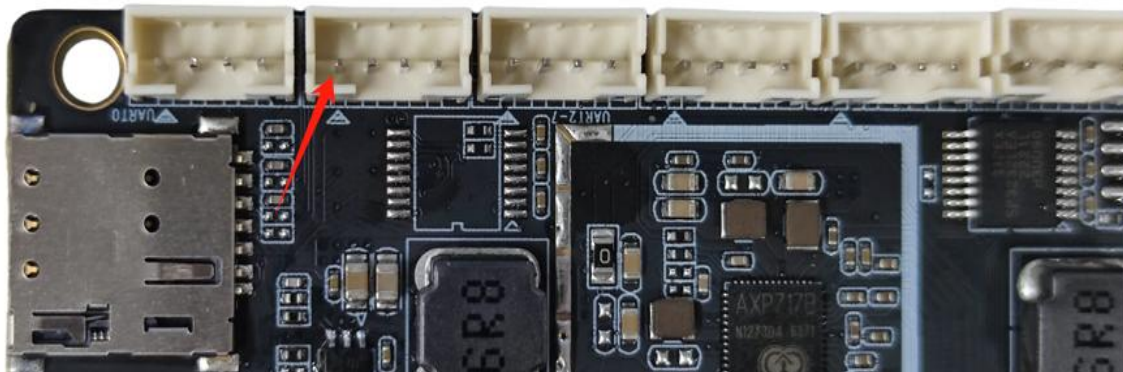Pinout (as shown by arrow direction in diagram)

S/N	Definition	Attribute	Description
1	GND	Ground	Ground
2	RX0	Input	UART0 TTL Data input
3	TX0	Output	UART0 TTL Data input
4	NC	NC	NC

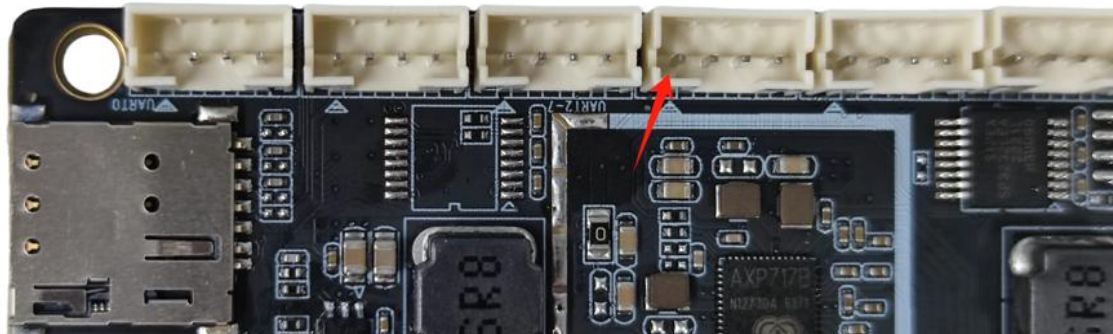◆ UART2 TTL Serial Port(Triangular mark indicates Pin 1, 4-pin/2.0mm pitch

S/N	Definition	Attribute	Description
1	GND	Ground	Ground
2	RX2	Input	UART2 TTL Data input
3	TX2	Output	UART2 TTL Data output
4	VCC	5 Power output	5V power output (3.3V optional)

◆ UART3 TTL Serial Port(Triangular mark indicates Pin 1, 4-pin/2.0mm pitch
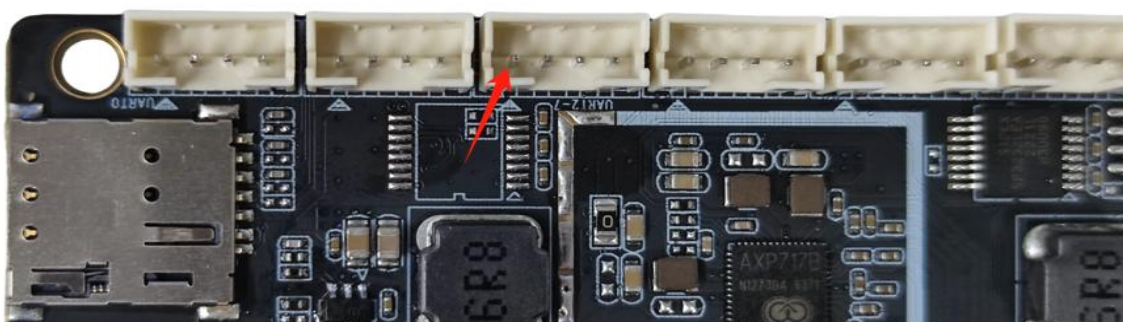
S/N	Definition	Attribute	Description
1	GND	Ground	Ground
2	RX3	Input	UART3 TTL Data input
3	TX3	Output	UART3 TTL Data output
4	VCC	5 Power output	5V power output (3.3V optional)

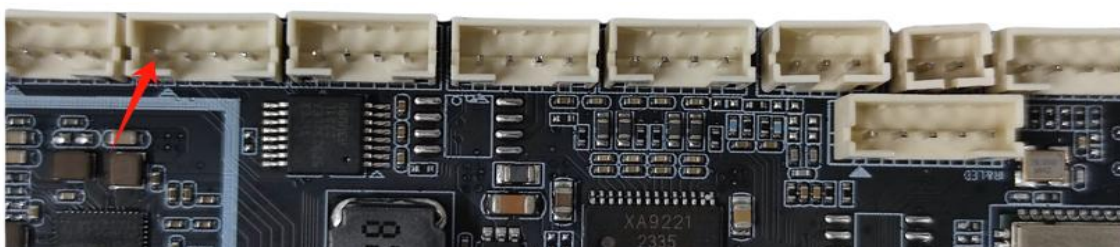◆ UART4 TTL Serial Por(Triangular mark indicates Pin 1, 4-pin/2.0mm pitch

S/N	Definition	Attribute	Description
1	GND	Ground	Ground
2	RX4	Input	UART4 TTL Data input
3	TX4	Output	UART4 TTL Data output
4	VCC	5 Power output	5V power output (3.3V optional)

TTL Serial Port Usage Notes：

1.Voltage Matching: Ensure compatible TTL 3.3V logic levels.
2.Pinout Verification: Confirm correct TX/RX wiring to avoid reversed connections.

◆ UART5 RS232 Serial Port (Triangular mark indicates Pin 1, 4-pin/2.0mm pitch - Default: RS232, Configurable as TTL)

S/N	Definition	Attribute	Description
1	GND	Ground	Ground
2	RX5	Input	UART5 data input (Default: RS232)
3	TX5	Output	UART5 data output (Default: RS232)

4	VCC	5 Power output	5V power output (3.3V optional)

◆ UART6 RS232 Serial Port (Triangular mark indicates Pin 1, 4-pin/2.0mm pitch - Default: RS232, Configurable as TTL）
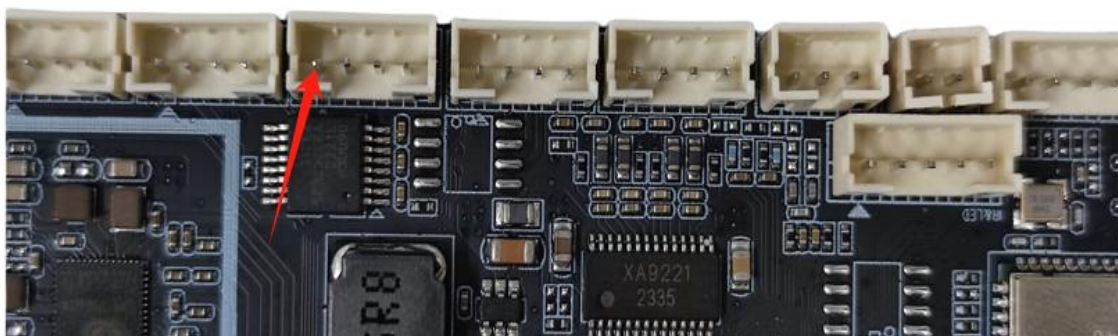
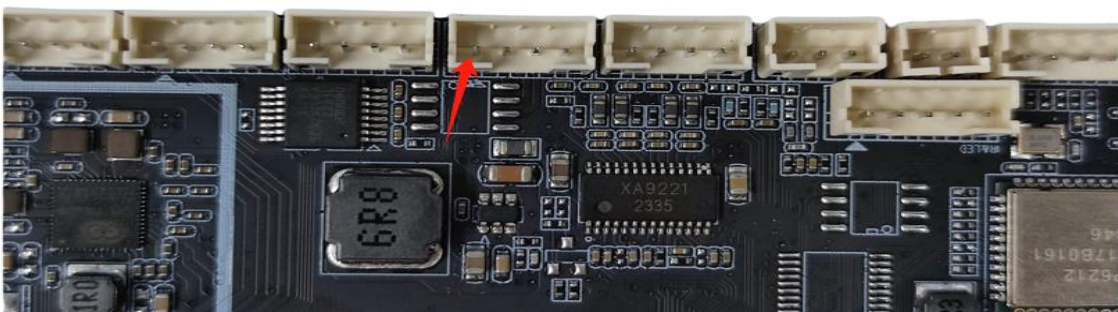| S/N	Definition	Attribute	Description
1	GND	Ground	Ground
2	RX6	Input	UART6 data input (Default: RS232)
3	TX6	Output	UART6 data output (Default: RS232)
4	VCC	5Power output	5V power output (3.3V optional)

RS232 Port Usage Notes：

1.Voltage Compatibility: Do not directly connect to TTL/RS485 devices - requires level matching.
2.Connection Warning: Verify correct TX/RX pairing before connection.

◆ UART7 TTL Serial Port (Triangular mark indicates Pin 1, 4-pin/2.0mm pitch - Default: TTL, Configurable as RS485）

S/N	Definition	Attribute	Description
1	GND	Ground	Ground
2	RX7	Output	UART7data input (Default: TTL, Configurable as RS485-B)

| 3 | TX7 | Output | UART7 data output (Default: TTL, Configurable as RS485-A) |
| 4 | VCC | 5 Power Output | 5V power output (3.3V optional) |

TTL&RS485 Port Usage Notes：

1.Voltage Matching: When configured as TTL, connect only to 3.3V TTL devices.

2.RS485 Compatibility: In RS485 mode, connect only to RS485 devices*(not TTL/RS232).

3.Polarity Warning: For RS485: TX→485A, RX→485B (do not

4.Port Mapping: Serial port 1 corresponds to device node ttyS1.

◆ RTC BAT Interface (Triangular mark indicates Pin 1, 2-pin/1.25mm pitch

S/N	Definition	Attribute	Description
1	GND	Ground	Ground
2	3V	Power	3V power supply

Safety Instructions：

1.Polarity Alert: Reverse connection may cause short-circuit, fire, or explosion risk.

2.Battery Replacement:

   - Use 3V CR2032 coin cell with solder tabs for accurate timekeeping.

   - Contact FAE for exact specifications if needed.

◆ **Speaker Output Interface** (Triangular mark indicates Pin 1, 4-pin/2.0mm pitch
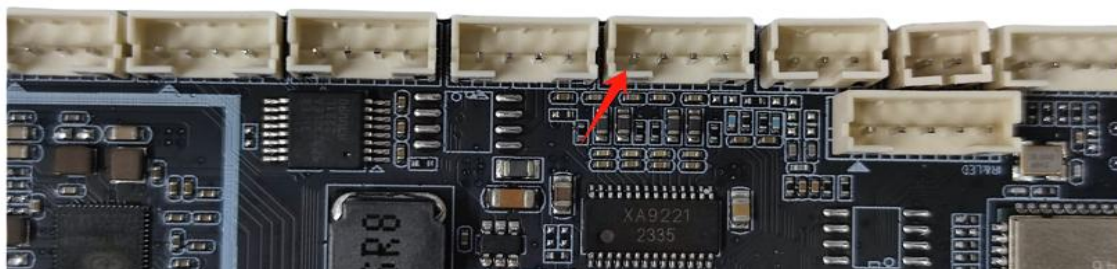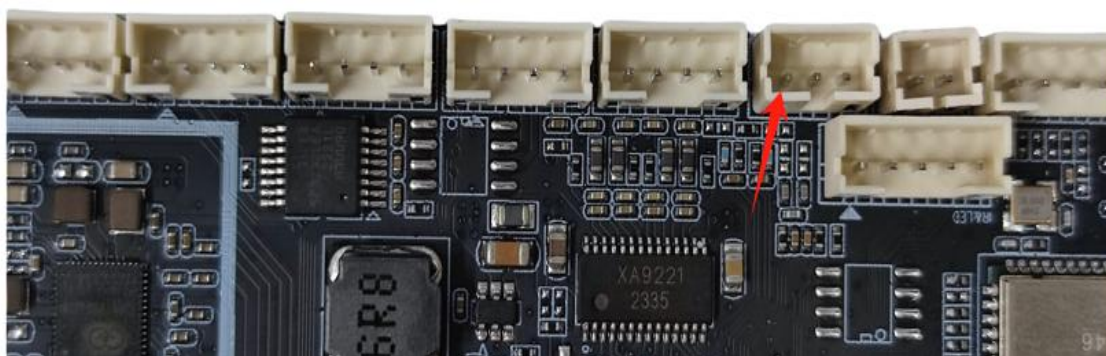
S/N	Definition	Attribute	Description
1	OUTP-L+	Output	Left channel positive (to speaker+)
2	OUTN-L-	Output	Left channel negative (to speaker-)
3	OUTN-R-	Output	Right channel negative (to speaker-)
4	OUTP-R+	Output	Right channel positive (to speaker+)

Usage Notes：

1.Dual-Speaker Configuration: For single speaker: Use either Pin1+Pin2 or Pin3+Pin4 pairs

2.Safety Protocol: Always connect speakers before power-on - no hot-plugging allowed

3.Power Limitations: Default output: 8Ω 1W - Ensure speaker rating exceeds actual output

◆ **Headphone Output** (Triangular mark indicates Pin 1,

3-pin/2.0mm pitch

S/N	Definition	Attribute	Description
1	HPOUTFB	Input	GND
2	HPOUTR	Output	Right channel audio (to headphone)
3	HPOUTL	Output	Left channel audio (to headphone)

Connection Warning：

1. Verify correct L/R channel and ground wiring to motherboard.

◆ Microphone Interface (Triangular mark indicates Pin 1, 2-pin/2.0mm pitch
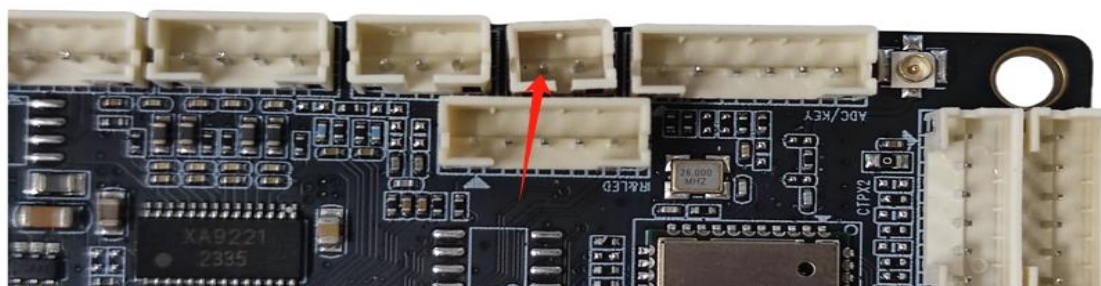
S/N	Definition	Attribute	Description
1	MIC+	Audio Input	Audio Input+
2	MIC-	Audio output	Audio Input-

Note：

1.Verify microphone polarity matches motherboard connections

IR Receiver & Status Indicato （Triangular mark indicates Pin 1, 5-pin/2.0mm pitch
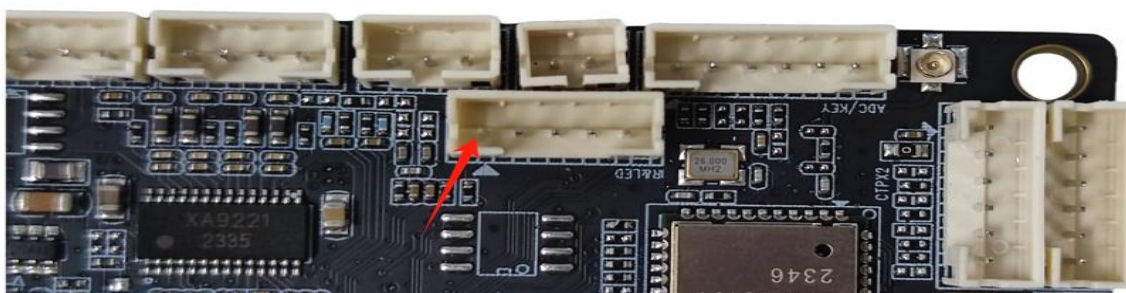
S/N	Definition	Attribute	Description
1	LED_B	Blue LED	System operational indicator

2	LED_R	RED LED	Standby status indicator
3	VCC	Power	3.3V power supply (for IR receiver)
4	GND	Ground	Ground
5	IR	Input	Infrared remote signal input

Critical Notes：

1.IR Receiver Requirement: Must use 3.3V-compatibleinfrared receiver module

2.Pay attention to whether the sequence of the indicator light matches the sequence of the IR.

◆ POWER/IO/ADCKEY（Triangular mark indicates Pin 1, 6-pin/2.0mm pitch
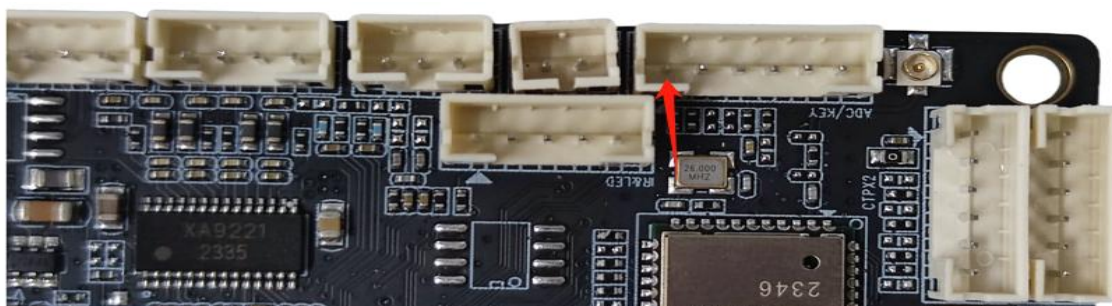
S/N	Definition	Attribute	Description
1	3.3V	3.3V Output	3.3V
2	PWR KEY	Input	Power on/off button control
3	IO	Input/Output	PH16 GPIO
4	IO	Input/Output	PH17 GPIO
5	ADC	Input	Key-value matching button input
6	GND	Ground	Ground

Usage Notes：

1.Voltage Limitation: Peripheral I/O must not exceed 3.3V use isolation/level-shifting circuits if higher voltages are present.

2.I/O Direction: Verify whether the pin is configured as input or output before use.

3.Power Leakage Check:Measure I/O voltage with a multimeter when powered off – it must read 0V to prevent back-powering.

4.Power Button Wiring: Connect PWR_KEY directly to ground via a button (no pull-up/down resistors needed)

5.ADC Implementation: For key-value matching, consult FAE for reference circuit design.

## ◆ CTP Capacitive Touch Panel Interface (Triangular mark indicates Pin 1, 6-pin/2.0mm pitch

S/N	Definition	Attribute	Description
CTP1/2(1)	3.3V	Output	3.3V Output
CTP1/2(2)	SCL	Output	clock signal
CTP1/2(3)	SDA	Input/Output	I2C data line
CTP1/2(4)	INT	Input	Interrupt signal
CTP1/2(5)	REST	Output	Reset signal
CTP1/2(6)	GND	Ground	Ground

Critical Notes：

1.Compatibility: Only supports I2C interface touch panels (verify before connection).

2.Voltage Matching: All signals are 3.3V logic level – use level shifters for 1.8V panels.

3.Safety Protocol: Always connect before power-on – no hot-plugging allowed.

◆ LVDS/EDP Voltage Selection Interface (Arrow mark indicates Pin 1, 2×3-pin/2.0mm pitch
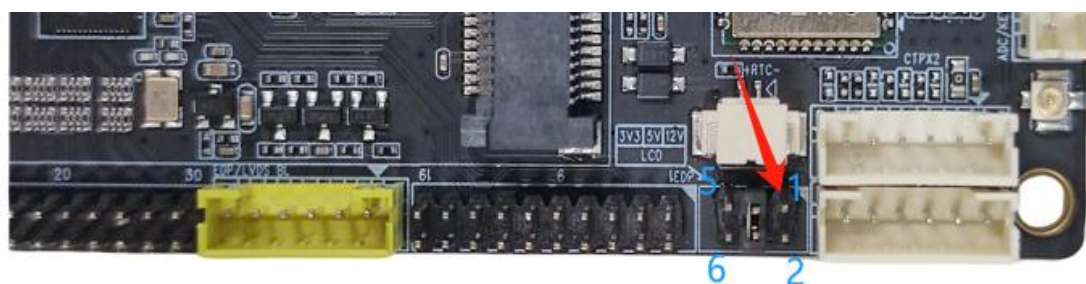
S/N	Definition	Attribute	Description
1	LCD_12V	Power In	Power In，+12V
2	LCD-VCC	Power In	Panel power
3	LCD_5V	Power In	Power In，+5V
4	LCD-VCC	Power In	Panel power
5	LCD_3.3V	Power In	Power In，+3.3V
6	LCD-VCC	Power In	Panel power

Configuration Guide：

1.Voltage Selection: Jumper 1-2: 12V operation , Jumper 3-4: 5V operation ,Jumper 5-6: 3.3V operation

2.Safety Warning:Set jumpers before power-on** to avoid panel damage.

◆ **EDPx2 LCD Panel Interface (Triangular mark indicates Pin 1, 2×10-pin/2.0mm pitch)**

S/N	Definition	Attribute	Description
1-2	VCC_Panel	Power Out	LCD power output (+) (Selectable: 3.3V/5V/12V via jumper)
3-4	GND	Ground	Ground
5	DPO0-	Output	EDP 0 Negative Data
6	DPO0+	Output	EDP 0 Positive Data
7	DPO1-	Output	EDP 1 Negative Data
8	DPO1+	Output	EDP 1 Positive Data
9-12	NC	NC	NC
13-14	GND	Ground	Ground
15	AUX-	Output	EDP AUX-

16	AUX+	Output	EDP AUX+
17-19	GND	Ground	Ground
20	NC	NC	NC

◆ LVDS

注 Critical Usage Notes：

　　1.Voltage Verification: Confirm the LCD's required voltage (3.3V/5V/12V) matches the jumper setting.

　　　- Ensure the board's power supply meets the panel's maximum current demand

　　2.Jumper Check: Use a multimeter to verify the selected voltage before connection.

　　3.Connection Safety: Align the connector properly (PML end first)–do not force or misalign to avoid damage. Never hot-plug – always connect the panel before　powering on.

　　4.Signal Integrity: Match all electrical definitions (e.g., DP0N/DP0P pairs) precisely.

◆ LVDS/EDP Backlight Power Control (Triangular mark indicates Pin 1, 6-pin/2.0mm pitch)

　Pinout (as shown by arrow direction in diagram)

LVDS/EDP Backlight control：
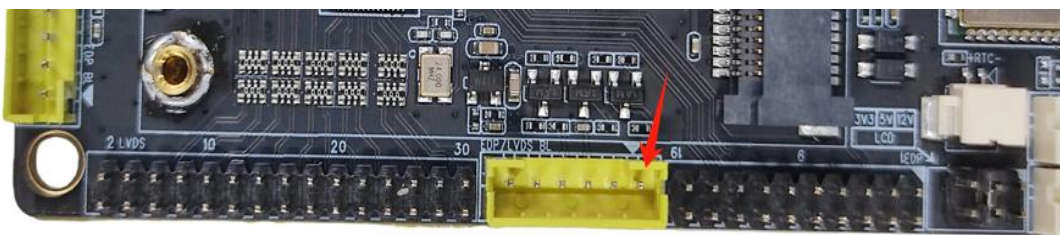
EDP Backlight control：

S/N	Definition	Attribute	Description
1	12V	Power	Backlight power output (12V)
2		Output	
3	BL_EN0	Output	Backlight enable control
4	BL_PWM	Output	Backlight brightness PWM control
5	GND	Ground	Ground connection
6	GND	Ground	Ground connection

Critical Usage Guidelines：

1.Power Restrictions:12V output is for backlight only–Do NOT use as system power input.

2.Dimming Method:Default: PWM dimming (verify panel specifications for compatibility).

3.Dimming Mode Switching: To switch between PWM and analog (ADI) dimming, consult FAE for hardware modifications.

4.High-Power Panels:

   - For panels ≥19" or power ≥15W:

     - Use an external power supply for backlight (avoid motherboard power draw).

     - Prevents system instability due to limited motherboard power capacity.

◆ LVDS (The triangle direction 2X15PIN/2.0)
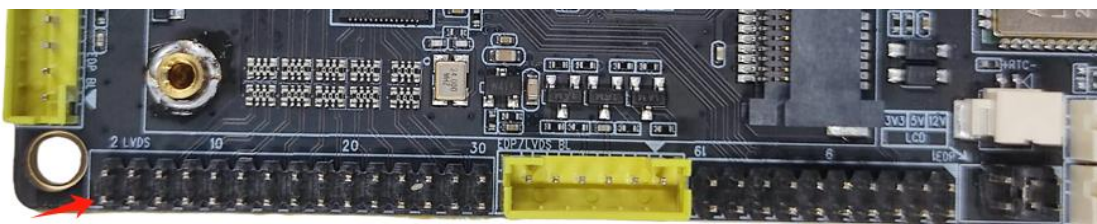
S/N	Definition	Attribute	Description
1-3	VCC_Panel	Power Output	LCD power output, according to the LCD screen optional 3.3V / 5V / 12V (by JP6 jumper jumper cap to choose)
4-6	GND	Output	Power Ground
7	RXO0-	Output	Pixel0 Negative Data (Odd)
8	RXO0+	Output	Pixel0 Positive Data (Odd)

9	RXO1-	Output	Pixel1 Negative Data (Odd)
10	RXO1+	Output	Pixel1 Positive Data (Odd)
11	RXO2-	Output	Pixel2 Negative Data (Odd)
12	RXO2+	Output	Pixel2 Positive Data (Odd)
13-14	GND	Ground	Ground connection
15	RXOC-	Output	Negative Sampling Clock (Odd)
16	RXOC+	Output	Positive Sampling Clock (Odd)
17	RXO3-	Output	Pixel3 Negative Data (Odd)
18	RXO3+	Output	Pixel3 Positive Data (Odd)
19	RXE0-	Output	Pixel0 Negative Data (Even)
20	RXE0+	Output	Pixel0 Positive Data (Even)
21	RXE1-	Output	Pixel1 Negative Data (Even)
23	RXE2-	Output	Pixel2 Negative Data (Even)
24	RXE2+	Output	Pixel2 Positive Data(Even)
25-26	GND	Output	Ground connection
27	RXEC-	Output	Negative Sampling Clock (Even)
28	RXEC+	Output	Positive Sampling Clock (Even)
29	RXE3-	Output	Pixel3 Negative Data (Even)
30	RXE3+	Output	Pixel3 Positive Data (Even)

Important Notes：

1.Display Compatibility Verification

  - Confirm the panel's voltage requirements match the board specifications.

  - Ensure the board's power supply can meet the panel's maximum current demand.

2.Power Connection Check

 - Use a multimeter to verify the jumper-selected voltage is correct before connection.

3.68-Pin LVDS Panel Connection

  - Align the connector with the PML end first – do not reverse or misalign to avoid damaging the panel or motherboard.

4.Safety Protocol

  - Match all electrical definitions before connection.

  - Always connect the panel before powering on–no hot-plugging allowed.

◆ MIPI DSI0/1（Triangular mark indicates Pin 1, 31-pin/0.3mm pitch）
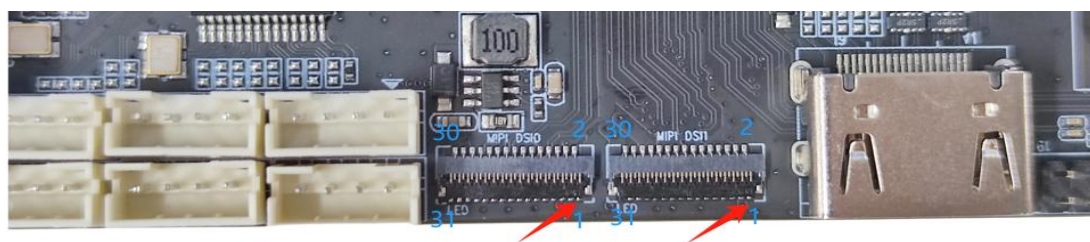
S/N	Definition	Attribute	Description
1-2	AVCC	Power	3.3V power supply
3	DVCC	Power	1.8V power supply
4	GND	Ground	Ground
5	RESET	Input	Reset pin (1.8V logic)
6	DVCC	Power	1.8V power supply
7	GND	Ground	Ground
8	DSI-D3N	Output	MIPI DATA
9	DSI-D3P	Input	MIPI DATA
10	GND	Ground	Ground
11	DSI-D0N	Output	MIPI DATA
12	DSI-D0P	Input	MIPI DATA
13	GND	Ground	Ground
14	DSI-CLKN	Output	MIPI CLK
15	DSI-CLKP	Input	MIPI CLK
16	GND	Ground	Ground
17	DSI-D1N	Output	MIPI DATA
18	DSI-D1P	Input	MIPI DATA
19	GND	Ground	Ground
20	DSI-D2N	Output	MIPI DATA
21	DSI-D2P	Input	MIPI DATA
22-23	GND	Ground	Ground
24-27	LED-	Power	Backlight power supply negative terminal
28	NC	NC	NC
29~31	LED+	Power	Backlight power supply positive terminal

Notes：

1. Please verify that the screen's voltage and current parameters match those of the board. The default backlight driving current of the board is 133mA. If this does not meet the requirements of the selected screen, please contact us for support.
2. Ensure the electrical definitions of the screen interface and board interface cables are consistent, and the PPC screen cable is correctly selected.
3. Signals such as RST in the interface operate at 1.8V. If connecting to a module with 3.5V levels, ensure proper level conversion is implemented.

◆ USB Interface *7（Triangular direction indicates Pin 1, 4PIN/2.0
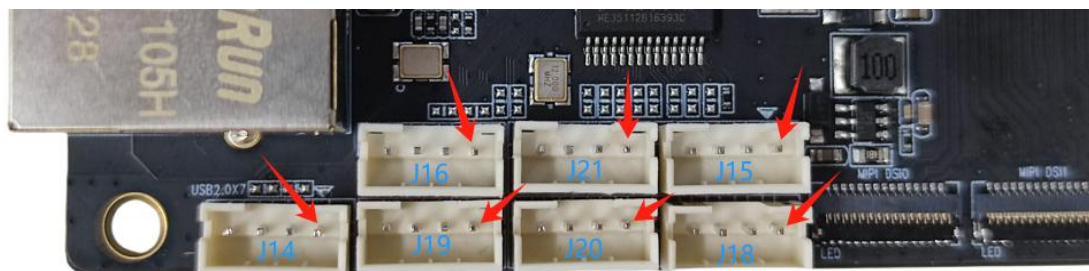
S/N	Definition	Attribute	Description
1	GND	Ground	Ground
2	DP	Input\Output	D+Signal line
3	DM	Input\Output	D-Signal line
4	5V Power	Power Output	Power Output +5V

Notes：

1.Verify the USB cable pinout before use to avoid reversing power and ground connections, which may cause damage or burnout.

2.Keep USB external cables as short as possible to meet usage requirements. Excessively long USB cables may lead to stability issues during operation.

3.USB signals are high-speed differential signals. Use cables with shielding layers to significantly improve anti-interference capability and device stability.

USB Port Specifications： （the average current per interface is 500mA）

S/N	Label/Bandwidth	Output Current	Thermal Detection
1	J14	1A	Controllable
2	J15	1A	Controllable
3	J16	1A	Controllable
4	J18	1A	Controllable
5	J19	1A	Controllable
6	J20	1A	Controllable
7	J21	1A	uncontrollable

◆ Other Standard Interfaces and Functions

USB2.0	USB TYPE-A*4	USB 2.0, supports up to 480 Mbps (60 MB/s) transfer rate. Current: 1A
Ethernet Port	RJ45	Supports 10/100 Mbps wired networking
HDMI	HDMI	One HDMI 2.0 TX interface, supports resolutions up to 4K@60fps.
WIFI&BT	AzureWave Module	Integrated Bluetooth + WiFi module, supports Wi-Fi 802.11b/g/n and Bluetooth 4.2 protocols.
PCIE	Standard PCIE	Supports external x4/x8 PCIe modules.

4 Specifications

Parameter		Min	Typical	Max
Power Supply	Voltage	--	12V	--
	Ripple	--	--	50mV
	Current	3A		
Power Current (No Peripherals)	Operating Current		130mA	180mA
	Standby Current		10mA	30mA
Power Current (with MDFI)	Operating Current		720mA	1000mA
Total Output	Current	--	--	3A
Environment	Relative Humidity	--	--	80%
	Operating Temperature	0℃	--	60℃
	Storage Temperature	-20℃	--	70℃

Note：When connecting an LVDS screen, ensure the correct operating voltage (5.3V, 5V, or 12V) is selected to avoid damaging the screen.

When connecting an EDP/MDFI screen, the board's operating and standby currents depend on the connected screen. The table above does not list all possible values.

Description：

Minimum System Test Items Description		
S/N	Test Item	Test Details
1	Basic Functionality Test	Verify core system functions including display, Wi-Fi, Bluetooth, Ethernet, 4G, USB, serial port, MIC, and speaker.
2	Firmware Upgrade Test	Validate motherboard upgrade functionality, including wired (line-flash) and remote OTA (over-the-air) updates.
3	High-Temperature Aging Test	Assess motherboard stability under 60°C for 7 days; ensure no crashes, abnormalities, black screens, or electrical failures during APK and network operation
4	Low-Temperature Power Cycling Test	Evaluate motherboard resilience at 0°C for 7 days; confirm no crashes, abnormalities, black screens, or electrical failures during APK and network operation.
5	ESD (Electrostatic Discharge) Test	Simulate real-world ESD conditions per **IEC 61000-4-2,Contact discharge: ±4kV,Air discharge: ±8kV,Product must meet Class A or B criteria to pass.
6	DDR Stress Test	Force DDR channels into high-load APK operations while running Memtester internally.
7	Power Cycling & Reboot Test	500 power cycles: System must boot normally after abrupt power cuts.3,000 automated reboots: System must restart reliably using a dedicated APK.

6 Configurable Parameters Table (Differentiation Points)

Category	Title		Standard version		High-en version	
DDR	1G	☐	2G	☑	4G	☐
EMMC	8	☑	16	☐	16	☐
WIFI+BT	2.4G	☐	2.4G+BT	☑	2.4G+BT	☐
					5G+BT	☐
4G/PCIE	☑		☐		☐	
ETH/RJ45	☑		☐		☐	
LVDS	☑		☐		☐	
EDP	☑ ☑		☐		☐	
HDMI	☑		☐		☐	
MIPI	☑ ☑		☐		☐	
USB*11	☑		☐		☐	
TTL*4	☑		☐		☐	
RS232*2	☑		☐		☐	
RS485*1	☐		☐		☐	
HDMI OUT	☑		☐		☐	

7 Usage Precautions

When assembling and using the motherboard, please pay attention to the following (but not limited to) critical points:。

1. Power Safety: Never install or connect peripherals while the board is powered on. Always wear an anti-static wrist strap or use other ESD protection tools during installation.

2. Cable Connections: When connecting peripherals via cables, ensure the pin definitions match between the peripheral and motherboard socket to prevent short circuits from incorrect wiring.

3. Mounting Procedure: When securing the motherboard with screws, apply even pressure to avoid PCB deformation that could cause circuit breaks.

4. Display Voltage Selection: For interfaces with selectable screen voltages (e.g., LVDS, EDP), verify the selected voltage matches the display specifications.

5. Peripheral Installation: When connecting peripherals (USB, UART, GPIO), pay attention to:
    - Correct pin configuration
    - Voltage level compatibility
    - Current output capability

6. Power Supply Requirements: Select input power based on:
    - Total peripheral power needs
    - Required voltage
    - Current requirements
    Ensure the power supply can meet all system demands.

8 Sizes

8.1 Board Size

PCB Length102mm , Width139mm, Height 20mm，For more details structural diagrams Please consult our sales representatives.